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ABSTRACT

The sender of communication strives to deliver information in depth; receivers of that communication favor more, and shorter, bits of information. In this study, the coefficient of balance between depth and scope was correlated with measures of the popularity of a group of magazines published in Austin, Texas. A regression formula was used to obtain scope/depth coefficients for the magazines, which were ranked by those values and by the indices of popularity. Hypotheses concerning the relationship of scope/depth balance to popularity were tested by correlations between the two rank-orders. Conclusions were that magazines with higher absolute circulation are characterized by depth-emphasis as defined in the study; magazines showing the most rapid circulation growth tend to emphasize scope; and the most successful magazines of the group are those whose quantitative editing patterns are most different from those of the rest. (Author/AA)

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COMPARISON OF SCOPE-DEPTH BALANCE WITH POPULARITY OF AUSTIN MAGAZINES, 1972-75

by

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COMPARISON OF SCOPE-DEPTH BALANCE WITH POPULARITY

OF AUSTIN MAGAZINES, 1972-75

To what extent does the quantitative manner in which a given magazine is edited seem to effect public response to that magazine? That is, do different public responses occur with different relationships between the number of items in a sample of the magazine and the respective sizes of those items?

This study attempts to answer that question through the analytical tool of scope-depth comparison, or the study of relationships between the variables of item-size and number of items of those particular sizes, in a sample of magazines published in Austin, Texas between 1972 and 1975. Apparently, the answer to the latter question is a qualified "yes."

I. RESEARCH BACKGROUND

Theoretical Groundwork

The research design was based on the work of George K. Zipf, Harvard communication researcher, and on a subsequent application of Zipf's scope-depth model to a study of national weekly magazines by Dr. Russell Bomberger.

According to the Westley and MacLean "gatekeeper" model, the editors of mass communication, in order to survive in the market, must select, from the confusion of possible happenings to be reported, the right happenings to attract and hold mass audiences. Zipf's theory inter-

sects with Westley and MacLean in the realm of quantitative measurement of communication samples.

The sender of communication strives toward the Force of Unification, or depth. Ideally for his purposes, his selection of reportage would be delivered in a single long item. But receivers of the reportage want the editor to expend effort to transmit specific information on each specific concept, thereby increasing its accessibility and decreasing reading effort on their part; they favor the Force of Diversification, or scope.

Zipf reasoned thus: "Because a message cannot be both a single long item and a series of short items, a balance must be structured between them."[1] This point of balance, which best serves the respective "economies" of both sender and receiver, Zipf called the point of "least effort." If a balance was present between scope and depth of items in a publication (Zipf studied newspapers and the Encyclopedia Britannica), then the inverse-square relationship also should be present between the sets of scope and depth variables, whereby one force should vary inversely with the square of the other.

There are several ways to demonstrate mathematically the inverse-square relationship between two sets of data representing opposing forces. Zipf chose to compute by least-squares the slope of a regression line of depth (item-size) upon scope (number of items). He found that his samples of newspapers and encyclopedias showed a slope of approximately -.5. Where the slope was nearer to -1, the publication emphasized depth over

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[1]Russell Bomberger, "An Analytical Comparison of Scope-Depth Balance with Popularity of General Circulation Weekly Magazines in the U.S., 1947-1960" (Ph.D. dissertation, Iowa State University, 1962), P. 9.

scope, and vice versa when the slope was nearer to 0. From this he drew the corollary that number-size relationships could be predictors of the "popularity" of publications; specifically, that communicators may increase the popularity of their products by emphasizing scope over depth.

Publications "in balance with an inevitable natural order," he said, should show a scope-depth coefficient of -.5, and that middle course should assure long-term popularity. Against this, Gregory Bateson argued that such publications would appear "entropic" to the public, or give the impression that no human effort has been exerted to align the variables--"that the coefficient shows that in that publication, editing matters are being left to God and guesses."[2]

Russell Bomberger set out to test the Zipfian hypotheses, assuming that scope-depth analysis should reveal much about basic message structures, patterns of public response to them, and the role of the gatekeeper. He sought to correlate the circulation trends of a sample of magazines with their scope-depth coefficients, and to see if the entire sample could be described by a coefficient close to Zipf's -.5.

Bomberger's sample reflected the national system of mass communications; it consisted of all national weekly magazines classified as "General Editorial" in the Ayer directory, published between 1947 and 1960, of which there were 18. To make circulation correlations valid, he eliminated magazines of "special interest," that were not available throughout the U.S., or that were "free" or accepted no advertising.

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[2] Ibid., p. 15.

Operational Procedure

His general procedure was to measure the sizes of items in his sample, count the numbers of items of various sizes, and plot the data in tables like those shown in the appendix. He used the logarithm of each datum in order to transform the curvilinear data into a linear relationship. Then, using a standard equation, he solved for b, the regression coefficient, for each magazine and for the entire sample:

$$b = \frac{n(\Sigma xy) - (\Sigma x)(\Sigma y)}{n(\Sigma x^2) - (\Sigma x)^2}$$

X equals the log of the number of items (independent variable), y equals the log of the size of the items (dependent variable), and n equals the total number of size categories.

Scope data were logs of the numbers of items, and depth data were logs of the midpoints of the various size categories. In this study, there were 17 size categories with midpoints of 100, 300, 500, 700, 900, 1500, 2500, 3500, 4500, 5500, 6500, 7500, 8500, 10,000, 12,500, 20,000, and 30000 words.

Item-size was measured in word-count units by finding the number of "words" in a column-inch of a particular type-face and multiplying that figure by the number of column-inches in the item. An important feature of both Bomberger's study and the present one is that illustrated matter was measured in the word-count unit applying to the nearest type-face, then added to the word count of the item, or coded separately if it was discrete from that item.

An "item" was loosely defined as a unit of editorial matter that could be understood without reference to any preceeding unit. The use of such separating devices as heads, stars, and white space by the editor was

interpreted as offering guides to the beginning and ending of each item. Cartoons and letters-to-the-editor were separate items; illustrations of an item, as said before, were measured as part of the item, but those that stood alone were considered seaparte items. "Incidental services to the reader," such as previews of upcoming issues, calendars of events, and inside-cover art, were omitted from consideration.

Bomberger then correlated the scope-depth coefficients of the magazines with two rough indices of their "popularity": latest absolute circulation as reported by the Ayers, and rate of circulation growth, derived by dividing the latest circulation figure by the earliest. He ranked the magazines according to the values of their coefficiants, then re-ranked them according to the "popularity" indices and computed coefficients of correlation between those sets of measures.

The findings in part confirmed and in part disproved Zipf's hypotheses. First, the coefficient characteristic of the sample as a whole, hereafter called the "typical" coefficient, was -.643, significantly different from the Zipfian mean of -.5. Scope-depth coefficients of the more "popular" magazines (by circulation trends) were significantly different from the typical coefficient in either direction; the less "popular" ones were not. There was a strong negative correlation between closeness to the typical coefficient and a favorable circulation status.

Zipf had predicted a strong positive correlation between scope-emphasis and the measures of popularity. This proved true for the rate of circulation growth, which also correlated highly with the Zipfian mean, but the magazines with highest circulation tended to be those characterized by depth-emphasis.

This configuration led Bomberger to suggest the following policy for the development of circulation: to capture an audience by emphasis on scope, i.e. a large number of separate short articles; then to shift toward depth-emphasis once the magazine has acquired a specific readership base for the gatekeeper to serve. This theory of quantitative editing, besides having been for the most part substantiated by the present study, has the added advantage of being intuitively reasonable.

II. THE PRESENT STUDY

Limitations and Differences

This study of regional magazines shares some of the limitations of Bomberger's research on national weeklies, with problems of interpretation specific to its own different market. Differences in the two samples are not such as to obscure a common pattern in the findings, which indiacte a fair degree of validity in the application of scope-depth analysis.

1. Undeniably, the two samples constitute entirely different magazine worlds. The eight Austin magazines in the present study range from local to sectional to national interest, whereas Bomberger's had to be nationally accessible. Also, the Austin group contains no weeklies, but has two fortnightlies and six monthlies; and various special interests are represented by the magazines in the current design. Descriptions of the Austin magazines are as follows:

Austin People Today

Austin's local monthly, chosen as a counterpart to the fortnightly Sun. This color-offset magazine currently is undergoing the latest of several changes in format; thus many of the results that pertain to it may change significantly soon.

Austin Sun

The newest publication, fortnightly, originally published in newspaper format, now in the process of converting to a magazine on newsprint. Its appeal to local subcultures makes it a direct competitor of Austin People Today.

Texas Observer

Fortnightly political magazine on newsprint, with a small but intense readership. Not surprisingly, it and the Sun compare most strongly in scope-depth balance to the national weeklies of the earlier study.

True West

Its circulation might be called "large but intense," indeed the largest in the sample and more transcendent of regional appeal than any except Texas Monthly. Purporting to be an exhaustive nonfiction chronicle of frontier life, its subject matter embraces a wider geographical range than any other. This is reflected in its position at the extreme end of both the circulation and the depth-emphasis ranges.

Texas Monthly, Texas Parade

Closest to being monthly general-interest magazines of regional appeal, these two are also in direct competition. The award-winning Texas Monthly is the success story of the sample, having risen in less than three years to a circulation of more than 90,000. The consistency of its writing and slickness of its graphic format are employed for broad entertainment purposes. Texas Parade, formerly an association magazine, only recently has gone on the newsstand and may still be seeking the ideal format for its new environment. Both show influences of para-regional publications from other parts of the United States.

Texas Highways, Texas Parks and Wildlife

Official color mothly magazines of the state highway and parks and wildlife departments respectively. Both have stable, established readerships and are designed for public relations and to promote

tourism and naturalism for their devotees. Since both have non-profit status and are subsidized by the agencies they represent, they are omitted from the hypotheses which correlate circulation with scope-depth balance. The editorial formats are static, and in any case, do not affect the circulation in a way comparable to that of the newsstand magazines.

Thus the magazines in the present sample are quite heterogeneous; but, as will be seen, they vary in the regression analysis exactly as one would expect, and conform to a range of coefficients almost identical to that of Bomberger's study. True, the present one excludes from the hypotheses some publications which may well be in competition with those surveyed, for the attention of the same audience. This may lower the degree to which the sample is representative of regional magazines offered to the population. Partly to counter this, scope-depth coefficients were computed for the agency magazines, not to include them in the hypothetical problem, but as a basis of comparison with those sold on newsstands.

2. The period of the study is an arbitrary one which frankly reflects accessibility rather than design. For each magazine, 20 issues were chosen at random from the last year's issues of the fortnightlies, and from the previous three years of the monthlies, ending in December 1975. This was a period of origination for some, consolidation for others, and business as usual for still others; thus it presents a fairly accurate picture only of the short-term trends of a regional publishing boom.

3. The working definition of "item" is a bit unscientific. Border-line decisions on what constituted separate items were settled subjectively by the author, and would not necessarily be perceived as such by different readers. But mistakes, if such there were, were constant in all similar measurements of the other magazines, and the number of items

was so great and the range so large that an error would have had to be very large to cause a shift from one size class to another.

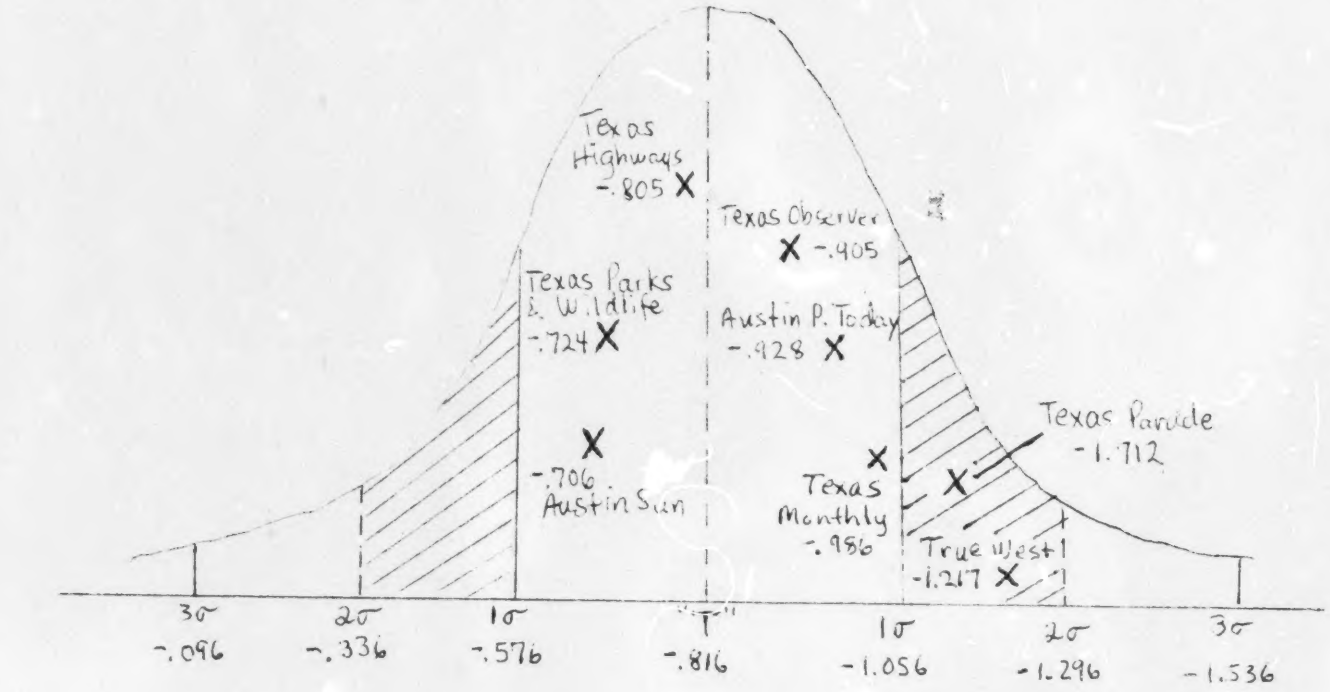
4. Measurements of the more highly pictorial magazines may not be directly comparable to those of the less pictorial. Word-count scores do not correspond to the actual number of words, but to words plus illustrative matter. Thus the scope-depth balance of any magazine is relative to the numbers and sizes of items in the magazine measured; it seems to offer more comparison of total design integration than of relationships of word-length.

5. Finally, the two studies share a concentration on an aspect of quantitative editing which is only one of a host of factors affecting public acceptance and circulation of magazines. It always has been unclear how strong a factor editorial content is compared to economic realities. Basically, the more general the contents of a magazine, the more likely that the magazine will be affected adversely by other media during times of financial recession.

It is hoped that these qualifications establish the scope of the present study as modest but valid for a study of regional magazines.

Interpretation of the Data

Obviously the present sample of magazines is substantially more oriented toward depth than were Bomberger's weeklies; i.e., they tend as a group to have longer items and fewer. The "typical" coefficient is -.816, as different from Bomberger's -.643 as the latter was from



GRAPH ILLUSTRATING THE RANGE OF SCORES FOR THE 10 MAGAZINES.

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the Zipfian mean, which was based on daily newspapers. Such a progression is reasonable and reflects the shifts in reader expectation along the publication chain.

The range of scores, however, is nearly the same; Bomberger's, from high to low, was on the order of .55; here, from Austin Sun's -.706 to True West's -1.217, is .511. Thus the magazines are more nearly homogeneous than might appear at first; indeed it is surprising that the range was so small, given such a motley sample. It is significant that the magazines not subject to the influence of the market, Texas Highways and Texas Parks and Wildlife, were in the very middle of the range and had coefficients closest to the "typical."[3]

Not surprisingly, the most scope-oriented coefficients were those of the fortnightlies, although the Sun's appears significantly more so than the Observer's. After all, these are charged with the responsibility of appearing every two weeks, and cannot economically report on the available news with a strong emphasis on depth.

The relationship among the monthlies is a bit harder to explain. Not necessarily in the case of True West, which must strike any reader as the epitome of a magazine in depth; its front pages have never known white space, and its back pages are crammed with gray fragments of articles jumped from the front. Austin People Today also appears in a likely position. But Texas Monthly and Texas Parade seem to be in reverse order: the former seems to be much more of a "depth" magazine due to its greater number of longer items. The explanation lies in the fact that the Monthly

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[3]These two magazines were not included in the computation of the scope-depth coefficent for the total sample, since they were not intended to figure in the hypotheses described below. Had they been included, the "typical" coefficient would have been changed to -.782--i.e., more scope-oriented.

concentrates a greater percentage of items in the three shortest size categories--the letters, news capsules, cartoons, etc.--than do most of the other magazines.

This prompts the observation that the scope-depth coefficient depends less strictly on the sizes and numbers of items in the magazine measured than on the distribution of these throughout the range of size categories. In general, adding y-values to the end of a data distribution without a corresponding rise in the x-values--as is the case with Texas Monthly, Austin Sun, and especially Texas Parks and Wildlife--causes a more scope-oriented coefficient.

Also, there is a "data-bulge" in categories 6 and 14--the 1500 and 10,000 word categories respectively--shared by Bomberger's study. He explains that items of this size are likely to have been conceived in terms of convenient standardized lengths, e.g. one page or eight pages, and thus more frequently used than items of more awkward length. In any case, where the bulge is marked, as in Texas Parade, Austin People Today, and indeed in the sample as a whole, the effect is to give a more depth-oriented coefficient than might otherwise have obtained.

With the scope-depth coefficients computed and rank-ordered, we pass to the specific hypotheses of the study, testing whether there is a significant correlation between scope-depth balance and "popularity," as measured by the two indices of circulation.

I. That there is a correlation between scope-emphasis and high absolute circulation; or that there is a correlation between depth-emphasis and high absolute circulation.

II. That there is a correlation between scope-emphasis and high rate of circulation growth; or between depth-emphasis and high rate of circulation growth.

III. That there is a correlation between typicality and high absolute circulation; or between non-typicality and high absolute circulation.

IV. That there is a correlation between typicality and high rate of circulation growth; or between non-typicality and high rate of circulation growth.

Obviously, each sub-hypothesis is simply the inverse of the other.

Looking at the scope-depth coefficients from a Zipfian standpoint, none of the Austin magazines has scope-emphasis; but since their range corresponds closely to that of Bomberger's study, we may assume that significant differences in the coefficients indicate real differences in quantitative editing patterns, and therefore that the magazines may be validly ranked by greater or lesser scope- and depth-emphasis. They are ranked by typicality and non-typicality according to the distance of their coefficients from the typical coefficient, as shown below.

Magazine	S-D. Coef.	Rank by Scope	Rank by Depth	Distance from Typ.	Rank by Typicality	Rank by Non-Typ.
Austin Sun	-.706	1	6	.110	2	5
Texas Obs.	-.905	2	5	.089	1	6
Austin Peop.	-.928	3	4	.112	3	4
Texas Month.	-.986	4	3	.170	4	3
Texas Parade	-1.172	5	2	.356	5	2
True West	-1.217	6	1	.401	6	1

The magazines are rank-ordered by the circulation indices below.

Magazine	1973 Circ(	1975 Circ.(a)	% Growth(b)	Rank-Order (a)	(b)
Austin Sun	2000	12000	1000.0	6	1
Texas Observ.	12426	14093	12.5	5	5
Austin People	15000	17300	15.3	4	4
Texas Month.	24000	90000	275.0	2	2
Texas Parade	40000	48000	20.0	3	3
True West	164200	164290	0.0	1	6

The formula for computing r, the coefficient of correlation between the two rank-orders in the separate hypotheses, is as follows:

$$r = 1 - \frac{6\Sigma d^2}{n(n^2-1)}$$

where d is the difference between rank-orders and n is the number of magazines being ranked.

Conclusions

Computations of r for the different hypotheses are given in the appendix. In the main, they indicate agreement with the general findings of the Bomberger study.

Magazines with higher circulation tend to be those which emphasize depth (r = .94). Also they tend to be markedly "different" from the quantitative editing patterns of their competitors (r = .88). Magazines showing the most rapid circulation growth during the period tend to be those which emphasize scope (r = .49).

The only hypothesis not substantiated is that which correlates typica lity with rate of circulation growth (r = .26). Apparently, a magazine's variance from typical quantitative patterns plays little or no role in determining how fast that magazine reaches its peak of circulation. This may be accounted for in the Austin sample by the fact that non-typicality manifests itself in strong depth-emphasis.

This is not to say that scope-depth balance is a prime determinant of circulation trends in the Austin group; only that there are strong correlations between the two. All other factors being equal, an editor may well choose to manipulate this balance accordingly in order to achieve different circulation objectives.

COMPUTATION OF SCOPE-DEPTH COEFFICIENT FOR THE TOTAL SAMPLE*

Size	Number	(y) Log S	(x) Log N	xy	x^2
100	1433	2.000	3.156	6.31	9.96
300	801	2.477	2.903	7.19	8.42
500	399	2.698	2.355	6.89	6.52
700	174	2.845	2.240	6.38	5.01
900	261	2.954	2.416	7.13	5.83
1500	460	3.176	2.663	8.45	7.08
2500	240	3.398	2.380	8.08	5.66
3500	160	3.544	2.204	7.81	4.85
4500	116	3.653	2.364	7.53	4.26
5500	67	3.740	1.806	6.75	3.26
6500	43	3.812	1.602	6.10	2.56
7500	37	3.875	1.568	6.07	2.45
8500	39	3.929	1.591	6.25	2.53
10000	58	4.000	1.764	7.05	3.10
12500	28	4.097	1.447	5.92	2.09
20000	8	4.301	.903	3.88	.81
30000	1	4.477	.000	0.00	0.00
	4282	58.976	33.260	107.78	74.39

* excluding Texas Highways & Texas Parks and Wildlife

$$b = \frac{n\Sigma xy - (\Sigma x)(\Sigma y)}{n\Sigma x^2 - (\Sigma x)^2}$$

$$b = \frac{17(107.78) - (58.976)(33.26)}{17(74.39) - (33.26)^2}$$

$$b = \frac{1832.26 - 1961.54}{1264.63 - 1106.22}$$

$$b = \frac{-129.28}{158.41}$$

$$b = \boxed{-.816}$$

COMPUTATION OF SCOPE-DEPTH COEFFICIENT
FOR AUSTIN PEOPLE TODAY

S	N	(y) log S	(x) log N	xy	x^2
100	124	2.000	2.093	4.18	4.38
300	83	2.477	1.919	4.75	3.68
500	52	2.698	1.716	4.62	2.94
700	29	2.845	1.462	4.15	2.13
900	64	2.954	1.806	5.33	3.26
1500	85	3.176	1 929	6.12	3.72
2500	29	3.398	1 462	4.96	2.13
3500	12	3.544	1.079	3.82	1.16
4500	4	3.653	.602	2.19	.36
	482	26.75	14.07	40.18	23.76

$$b = \frac{n\Sigma xy - (\Sigma x)(\Sigma y)}{n\Sigma x^2 - (\Sigma x)^2}$$

$$b = \frac{9(40.18) - 26.75(14.07)}{9(23.76) - (14.07)^2}$$

$$b = \frac{361.62 - 376.37}{213.84 - 197.96}$$

$$b = -\frac{14.75}{15.88}$$

$$b = \boxed{-.928}$$

COMPUTATION OF SCOPE-DEPTH COEFFICIENT FOR AUSTIN SUN

S	N	(y) Log S	(x) Log L	xy	x^2
100	317	2.000	2.501	5.00	6.25
300	229	2.477	2.359	5.84	5.56
500	77	2.698	1.856	5.00	3.55
700	35	2.845	1.544	4.39	2.38
900	65	2.954	1.812	5.35	3.28
1500	96	3.176	1.982	6.29	3.92
2500	56	3.398	1.746	5.93	3.05
3500	24	3.544	1.380	4.89	1.90
4500	12	3.653	1.079	3.94	1.16
5500	7	3.740	.845	3.16	.71
6500	1	3.812	.000	0.00	0.00
	919	34.30	17.13	49.82	31.76

$$b = \frac{n\Sigma xy - (\Sigma x)(\Sigma y)}{n\Sigma x^2 - (\Sigma x)^2}$$

$$b = \frac{11(49.82) - (34.30)(17.13)}{11(31.76) - (17.13)^2}$$

$$b = \frac{548.02 - 587.55}{349.36 - 293.43}$$

$$b = -\frac{39.53}{55.93}$$

$$b = \boxed{-.706}$$

COMPUTATION OF SCOPE-DEPTH COEFFICIENT FOR TEXAS HIGHWAYS

S	N	(y) Log S	(x) Log N	xy	x^2
100	146	2.000	2.164	4.32	4.68
300	50	2.477	1.698	4.20	2.88
500	9	2.698	.954	2.57	.91
700	5	2.845	.698	1.98	.48
900	20	2.954	1.301	3.84	1.69
1500	37	3.176	1.568	4.97	2.45
2500	32	3.398	1.505	5.11	2.26
3500	23	3.544	1.361	4.82	1.85
4500	21	3.653	1.322	4.82	1.74
5500	9	3.740	.954	3.56	.91
6500	18	3.812	1.255	4.78	1.57
7500	6	3.875	.778	3.01	.60
8500	3	3.929	.477	1.87	.22
10000	2	4.000	.301	1.20	.09
	381	46.10	16.33	51.12	22.38

$$b = \frac{n\Sigma xy - (\Sigma x)(\Sigma y)}{n\Sigma x^2 - (\Sigma x)^2}$$

$$b = \frac{14(51.12) - (46.10)(16.33)}{14(22.38) - (16.33)^2}$$

$$b = \frac{715.68 - 753.10}{313.32 - 266.86}$$

$$b = \frac{-37.42}{46.46}$$

$$b = \boxed{-.805}$$

COMPUTATION OF SCOPE-DEPTH COEFFICIENT
FOR TEXAS MONTHLY

S	N	(y) Log S	(x) Log N	xy	x^2
100	441	2.000	2.644	5.28	6.99
300	175	2.477	2.243	5.55	5.03
500	95	2.698	1.977	5.33	3.90
700	48	2.845	1.681	4.78	2.82
900	52	2.954	1.716	5.06	2.94
1500	134	3.176	2.127	6.75	4.52
2500	64	3.398	1.806	6.13	3.26
3500	42	3.544	1.623	5.75	2.63
4500	21	3.653	1.322	4.82	1.74
5500	11	3.740	1.041	3.89	1.08
6500	8	3.812	.903	3.44	.81
7500	11	3.875	1.041	4.03	1.08
8500	12	3.929	1.079	4.23	1.16
10000	18	4.000	1.255	5.02	1.57
12500	20	4.097	1.301	5.33	1.69
20000	6	4.301	.778	3.34	.60
30000	1	4.477	.000	0.00	0.00
	1159	58.97	24.53	78.80	41.82

$$b = \frac{n\Sigma xy - (\Sigma x)(\Sigma y)}{n\Sigma x^2 - (\Sigma x)^2}$$

$$b = \frac{17(78.80) - (58.97)(24.53)}{17(41.82) - (24.53)^2}$$

$$b = \frac{1339.68 - 1447.09}{710.94 - 602.06}$$

$$b = -\frac{107.41}{108.88}$$

$$b = \boxed{-.986}$$

COMPUTATION OF SCOPE-DEPTH COEFFICIENT

FOR TEXAS OBSERVER

B	N	(y) Log S	(x) Log N	xy	x^2
100	203	2.000	2.307	4.61	5.32
300	103	2.477	2.012	4.98	4.05
500	33	2.698	1.518	4.09	2.30
700	20	2.845	1.301	3.70	1.69
900	27	2.954	1.431	4.22	2.04
1500	52	3.176	1.716	5.45	2.94
2500	27	3.398	1.731	4.86	2.04
3500	12	3.544	1.079	3.82	1.16
4500	7	3.653	.845	3.08	.71
5500	4	3.740	.602	2.25	.36
6500	2	3.812	.301	1.14	.09
	490	34.30	14.55	42.24	22.70

$$b = \frac{n\Sigma xy - (\Sigma x)(\Sigma y)}{n\Sigma x^2 - (\Sigma x)^2}$$

$$b = \frac{11(42.24) - (34.30)(14.55)}{11(22.70) - (14.55)^2}$$

$$b = \frac{464.64 - 499.06}{249.70 - 211.70}$$

$$b = -\frac{34.42}{38.00}$$

$$b = \boxed{-.905}$$

COMPUTATION OF SCOPE-DEPTH COEFFICIENT FOR TEXAS PARADE

S	N	(y) Log S	(x) Log N	xy	x^2
100	240	2.000	2.380	4.76	5.66
300	67	2.477	1.826	4.47	3.26
500	53	2.698	1.724	4.65	2.97
700	24	2.845	1.380	3.92	1.90
900	29	2.954	1.462	4.31	2.13
1500	41	3.176	1.612	5.11	2.59
2500	32	3.398	1.505	5.11	2.26
3500	26	3.544	1.414	5.01	1.99
4500	31	3.653	1.491	5.44	2.22
5500	13	3.740	1.113	4.16	1.23
6500	10	3.812	1.000	3.81	1.00
7500	4	3.875	.602	2.33	.36
8500	4	3.929	.602	2.36	.36
10000	18	4.000	1.255	5.02	1.57
	592	46.10	19.34	60.46	29.50

$$b = \frac{n\Sigma xy - (\Sigma x)(\Sigma y)}{n\Sigma x^2 - (\Sigma x)^2}$$

$$b = \frac{14(60.46) - (46.10)(19.34)}{14(29.50) - (19.34)^2}$$

$$b = \frac{846.44 - 891.96}{413.00 - 374.26}$$

$$b = \frac{-45.52}{38.74}$$

$$b = \boxed{-1.172}$$

COMPUTATION OF SCOPE-DEPTH COEFFICIENT FOR TEXAS PARKS AND WILDLIFE

S	F	(y) Log S	(x) Log F	xy	x^2
100	134	2.000	2.127	4.25	4.52
300	78	2.477	1.[illegible]	4.62	3.49
500	43	2.698	1.633	4.40	2.66
700	7	2.845	.[illegible]	2.40	.71
900	22	2.954	1.342	3.96	1.80
1300	21	3.[illegible]6	1.322	4.19	1.75
2500	44	3.398	1.643	5.58	2.69
3500	29	3.544	1.462	5.18	2.13
4900	28	3.653	1.447	5.28	2.09
5500	7	3.740	.845	3.16	.71
6500	6	3.812	.778	2.96	.60
8500	1	3.929	.000	0.00	0.00
10000	1	4.000	.000	0.00	0.00
12500	1	4.097	.000	0.00	0.00
	418	46.32	15.31	46.03	23.15

$$b = \frac{n\Sigma xy - (\Sigma x)(\Sigma y)}{n\Sigma x^2 - (\Sigma x)^2}$$

$$b = \frac{14(46.03) - (46.32)(15.31)}{14(23.15) - (15.31)^2}$$

$$b = \frac{644.42 - 709.34}{324.10 - 234.48}$$

$$b = \frac{-64.92}{89.62}$$

$$b = \boxed{-.724}$$

COMPUTATION OF SCOPE-DEPTH COEFFICIENT

FOR TRUE WEST

d	N	(y) log S	(x) log N	xy	x^2
100	108	2.000	2.033	4.06	4.13
300	144	2.477	2.158	5.34	4.65
500	49	2.698	1.690	4.56	2.85
700	16	2.845	1.255	3.57	1.57
900	24	2.954	1.380	4.07	1.90
1500	52	3.176	1.716	5.45	2.94
2500	32	3.398	1.509	5.11	2.28
3500	44	3.544	1.643	5.82	2.69
4500	41	3.653	1.612	5.90	2.59
5500	32	3.740	1.505	5.63	2.26
6500	19	3.812	1.278	4.87	1.63
7500	22	3.875	1.342	5.20	1.80
8500	23	3.929	1.361	5.34	1.85
10000	22	4.000	1.342	5.36	1.80
12500	8	4.097	.903	3.69	.81
20000	2	4.301	.301	1.29	.09
	640	54.49	23.03	73.22	35.82

$$b = \frac{n\Sigma xy - (\Sigma x)(\Sigma y)}{n\Sigma x^2 - (\Sigma x)^2}$$

$$b = \frac{16(95.22) - (54.49)(23.03)}{16(35.82) - (23.03)^2}$$

$$b = \frac{1203.52 - 1255.33}{573.12 - 530.56}$$

$$b = -\frac{51.81}{42.56}$$

$$b = \boxed{-1.217}$$

COMPUTATION OF CORRELATION COEFFICIENT

FOR HYPOTHESIS I

Magazine	Rank by Abs. Circ.	Rank by Score	Diff.	Diff.^{2}
Sun	6	1	5	25
Observer	5	2	3	9
A.P.T.	4	3	1	1
Tex. Monthly	2	4	2	1
Tex. Parade	3	5	2	4
True West	1	6	5	25
				68

$$r = 1 - \frac{6\Sigma d^2}{n(n^2-1)} \quad 1 - \frac{6(68)}{6(35)} = \boxed{-.94}$$

B.

Magazine	Rank by Abs. Circ.	Rank by Depth	Diff.	Diff.^{2}
Sun	6	6	0	0
Observer	5	5	0	0
A.P.T.	4	4	0	0
Tex. Monthly	2	3	1	1
Tex. Parade	3	2	1	1
True West	1	1	0	0
				2

$$r = 1 - \frac{6\Sigma d^2}{n(n^2-1)} = 1 - \frac{6(2)}{6(35)} = \boxed{+.94}$$

COMPUTATION OF CORRELATION COEFFICIENT FOR HYPOTHESIS II

Magazine	Rank by Rate of Growth	Rank by Scope	Diff.	Diff.^{2}
Sun	1	1	0	0
Observer	5	2	3	9
A.P.T.	4	3	1	1
Tex. Monthly	2	4	2	4
Tex. Parade	3	5	2	4
True West	6	6	0	0
				18

$$r = 1 - \frac{6\Sigma d^2}{n(n^2-1)} = 1 - \frac{6(18)}{6(35)} = +.49$$

Magazine	Rank by Rate of Growth	Rank by Depth	Diff.	Diff.^{2}
Sun	1	6	5	25
Observer	5	5	0	0
A.P.T.	4	4	0	0
Tex. Monthly	2	3	1	1
Tex. Parade	3	2	1	1
True West	6	1	5	25
				52

$$r = 1 - \frac{6\Sigma d^2}{n(n^2-1)} = 1 - \frac{6(52)}{6(35)} = -.49$$

COMPUTATION OF CORRELATION COEFFICIENT FOR HYPOTHESIS III

A.

Magazine	Rank by Abs. Circ.	Rank by Typicality	Diff.	Diff.^{2}
Sun	6	2	4	16
Observer	5	1	4	16
A.I.T.	4	3	1	1
Tex. Monthly	2	4	2	4
Tex. Parade	3	5	2	4
True West	1	6	5	25
				66

$$r = 1 - \frac{6\Sigma d^2}{n(n^2-1)} = 1 - \frac{6(66)}{6(35)} = \boxed{-.88}$$

B.

Magazine	Rank by Abs. Circ.	Rank by Non-Typicality	Diff.	Diff.^{2}
Sun	6	5	1	1
Observer	5	6	1	1
A.I.T.	4	4	0	0
Tex. Monthly	2	3	1	1
Tex. Parade	3	2	1	1
True West	1	1	0	0
				4

$$r = 1 - \frac{6\Sigma d^2}{n(n^2-1)} = 1 - \frac{6(4)}{6(35)} = \boxed{+.88}$$

COMPUTATION OF CORRELATION COEFFICIENT
FOR HYPOTHESIS IV

A.

Magazine	Rank by Rate of Growth	Rank by Typicality	Diff.	Diff.^{2}
Sun	1	2	1	1
Observer	5	1	4	16
A.P.I.	4	3	1	1
Tex. Monthly	2	4	2	4
Tex. Parade	3	5	2	4
True West	6	6	0	0
				26

$$r = 1 - \frac{6\Sigma d^2}{n(n^2-1)} = 1 - \frac{6(26)}{6(35)} = \boxed{+.26}$$

B.

Magazine	Rank by Rate of Growth	Rank by Non-Typicality	Diff.	Diff.^{2}
Sun	1	5	4	16
Observer	5	6	1	1
A.P.I.	4	4	0	0
Tex. Monthly	2	3	1	1
Tex. Parade	3	2	1	1
True West	6	1	5	25
				44

$$r = 1 - \frac{6\Sigma d^2}{n(n^2-1)} = 1 - \frac{6(44)}{6(35)} = \boxed{-.26}$$